

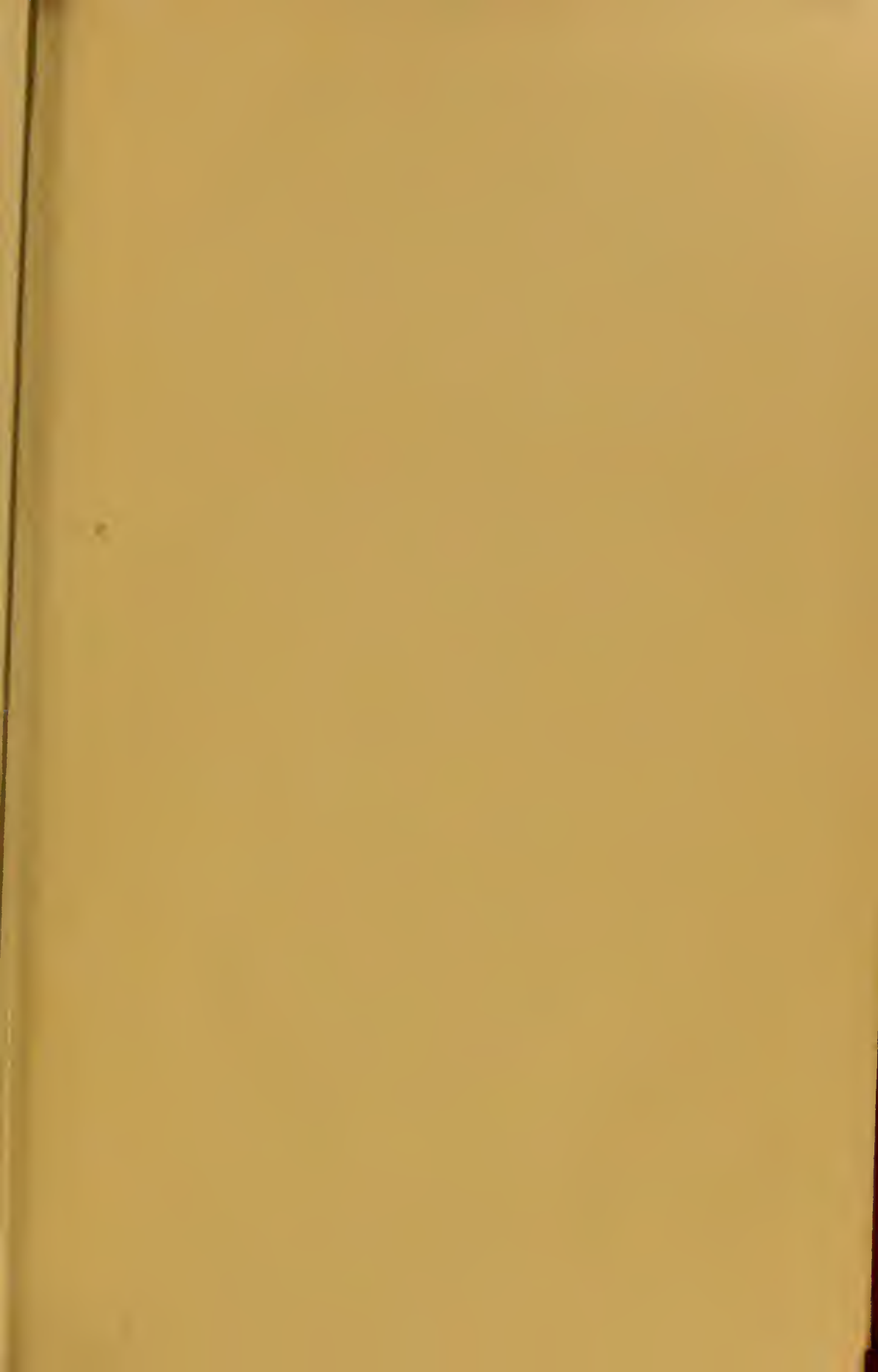


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to united, or digested, that all their parts are more assimilated to enter into chyle; also another essential circumstance is, these vegetable bodies, receive, in the process, such a quantity of the fire as animalizes them the more. Thus barley, from the process of malting and brewing, receives such a quantity of fire from the air in malting, and from the fire, in brewing, as considerably to alter its nature and qualities. But, in the Count's calculations he forgets how much more easily a Bavarian soldier, from habit and from the climate, is supported with food, than an English soldier.*

* But pray, Mr. Cavendish, explain this experiment of Dr. Priestley's, in Vol. 4th, p. 36. also the note in page 33 of this Letter, upon the phosphoric acid and the calx of lead producing inflammable air; but they ought to have produced dephlogisticated air according to your theory.

In this Letter I have just examined your theory, principally in one department of nature, viz. respiration; but I am able to prove the same absurdities in any of the rest.

NOW, SIR, BEFORE I CONCLUDE, LET ME CALL UPON YOU IN THE MOST SOLEMN, AND SERIOUS MANNER, EITHER PUBLICLY TO REFUTE, OR ACKNOWLEDGE MY SYSTEM. BUT, IF YOU STILL CONTINUE *mute*, I THINK YOUR MOST PREJUDICED FRIENDS CAN BE AT NO LOSS FOR THE CAUSE.

I AM

Your most obedient and humble Servant,

ROBERT HARRINGTON.

Carlisle, JUNE 10, 1798.

FINIS.

AN
APPENDIX
TO MY
NEW SYSTEM
OF
FIRE
AND
PLANETARY LIFE;

SHEWING THAT
THE SUN AND MOON
ARE INHABITED,
AND THAT
THEY ENJOY THE SAME TEMPERAMENT
AS OUR EARTH.

—◆—
BY ROBERT HARRINGTON, M. D.

—〰—
LONDON:
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[Dec. 1798.]

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AN

APPENDIX, &c.

AFTER the clear elucidation of my system in my Pamphlet, it appears unnecessary for me to enlarge further upon it. But we cannot place truth in too strong a light, particularly where we have the prejudices of mankind to combat; and which are fixed by such high authority as that of NEWTON, whose great and comprehensive mind was certainly warped to establish his system of Gravity, otherwise, as a close mathematical reasoner, he could not have seriously advanced such doctrine as this system of his teaches. He supposed that the gravitation of the moon to the earth, at the conjunction, was decreased, and in consequence the projectile force increased, the sun greatly attracting the moon, and drawing her from the earth, which, as he thought, would account for the phænomena that take place at the conjunction. But then the same phænomena take place at the opposition, and instead of the moon being placed between her two great attracting bodies, viz. the earth and the sun, she is opposed to them; so that in reality the attractive power of the earth and sun both draw in the same line: in consequence the moon must be greatly attracted at the opposition; that is, gravitate towards those bodies with both their forces or attractions.

When the moon is in her opposition, both the sun and the earth's action of gravity draw in the same line, and must powerfully operate upon the moon. We will suppose with some, for the sake of argument, with the force of thirteen degrees; and then in consequence the moon must gravitate towards the earth with this considerable force. But at the conjunction the moon is placed between those two gravitating bodies, viz. the sun and earth. Then their forces upon it are divided. If the earth's power, according to them, is in the proportion of ten, and the sun three; then at the conjunction she will only gravitate to the earth with the force of seven degrees; and, according to Sir Isaac's doctrine, the moon will be drawn from the earth in her conjunction, and account for her quicker motion, as at this period the projectile force predominates. But most unfortunately for Sir Isaac's doctrine, the same phenomena take place at the moon's opposition. It there equally recedes from the earth; and also has its motion in the same proportion accelerated. And then, instead of its gravitation being lessened, it must have it considerably increased, as the sun and earth draw in the same line, according to the Newtonian doctrine. Then, according to reason, truth, and common sense, its gravity must be increased in the proportion of thirteen to seven to what it is in the moon's conjunction. Nothing can be more obvious, clear, and just. It is scarcely necessary to elucidate it by a piece of iron being placed between two loadstones of different powers: when they act in opposite directions, their force must be weaker upon the iron, as in the moon's conjunction, than when they act

act in the same line or direction, as in the moon's opposition. Therefore, as this doctrine of Sir Isaac's shews such a contradiction to the phenomena, let us see if mine accords with them.

As I suppose the principal moving power is from fire producing repulsion; therefore, when it acts most powerfully, in the same proportion must the moon be repelled from the earth, and its motion accelerated.—At the conjunction, the moon's gravity to the earth must be greatly lessened, so much so, that some (and particularly Mr. Baxter, author of "*Mathe.*") have apprehended that either the parallax of the sun is very different from that which is assigned by astronomers, or that the moon ought necessarily to abandon the earth, because she is considerably more attracted by the sun than by the earth at that time.

But let us see if my system can rationally account for these difficulties. In the conjunction the moon is opposed to the centre of the heated earth, and must in consequence be greatly repelled, its motion being then accelerated. But to counteract that very great repulsion which would in consequence take place, and also the sun's attraction, which is so very considerable, the quantity of matter in the sun being almost 230,000 times as great as the quantity of matter in the earth, and this point of equal attraction between the earth and the sun is supposed about 70,000 times nearer the earth than the moon is at her change; therefore, under these circumstances, the moon must undoubtedly leave the earth, and fall precipitately into the sun. But, I say, to counteract this, there is the repulsive principle in the sun, which repels the moon to keep
her

her proper station, counteracting both the earth's repulsion and the sun's attraction. As the moon proceeds to her first quadrature, she moves from the centre of the heated earth; and, upon going to the opposition, she there opposes her heated centre immediately to the earth, which will produce a strong repulsion; but not so strong a repulsion as when opposed to the earth's heated centre, as in the conjunction, the moon being a less body than the earth, consequently will repel less, and, therefore, does not require the repulsion of the sun on her other hemisphere. Then, from the increased repulsion at the conjunction and opposition, which is so strong as to move this immense body the moon, driving her a greater distance from the earth, increasing her motion, and making her move swifter, we must be certain it must affect our earth. And as our waters being a fluid body, therefore easily susceptible of motion, they are in consequence greatly moved, the tides upon our seas being most considerable at that time.—We cannot help here expressing our admiration of the great wisdom of God in so wonderfully adjusting the movements of this satellite, regulating her motions so as to have such happy effects upon our planet, producing the motions in our waters, so as not only to keep them from putrefying, but to be the great means of navigation.—To me an atheist appears a most gross, ignorant, and absurd character. Who can reflect upon those most stupendous works, without calling out, *There must be a God!*—“*and that there is all nature cries aloud.*”

Now,



Now, to place my doctrine in a conspicuous light to my reader, I have given him a drawing of the sun, earth, and moon's motions, and he will there see, in the most striking manner, that the moon's motion is accordingly as it is under the influence of fire, or repulsion. In her conjunction she is directly over the centre of the earth, when heated by the sun; at her opposition her own heated centre is directly opposed to the earth; and, as in mechanics the smaller or lighter body is the easiest moved, it therefore will be the body upon which the repulsion will principally operate. As their situation changes
from

from being opposed to the repulsive centre of each, the moon will accordingly be more under the attractive and gravitating principle, and move nearer and slower. By accurately attending to the figure, you may, *a priori*, ascertain the motion and distance of the moon.

And when these two leading principles, viz. repulsion and gravitation, change their action, so as to move such an immense ponderous body as the moon, we must be well assured that the waters upon our earth will be affected.—As, for instance, when the repelling power predominates, so as to move the moon so much out of her course, the reaction of the moving body will press upon our great seas, and drive their waters more at this time upon their shores and upon the poles.—The moon's motion is also supposed to have a great influence upon our atmosphere, and even upon our constitution, which is not at all surprising, considering the amazing repelling and gravitating principles.

When the earth is in its aphelion, the moon is in her aphelion; and *vice versa*, when the one is in its perihelion the other is so likewise. Now let us see if the system of gravitation will account for these phænomena. When the earth is in its aphelion, it is supposed to gravitate with less force to the sun. But we must here make this observation—What could produce its being less attracted by the sun? The earth is not supposed to have lost any of its matter at this particular period. But, according to this doctrine, as it is so constantly changing its distance from the sun, it must be as constantly changing its gravitation. And, according to Sir Isaac's theory,

as

as gravitation and the projectile force are uniform in their powers, why are the changes of its distance from the sun so constantly varying? And also, which is still stronger reasoning, when the sun attracts the earth with less force in the earth's aphelion, why should the moon also at this period be in its aphelion; that is, gravitate with less force to the earth, and also have its motion accelerated?—In the cool disquisition of philosophy, exempt from prejudice, I ask the Newtonians why all these phænomena take place?

Now let us enquire why, according to my system, these phænomena take place.—When the earth, in our summer, has its north pole turned towards the sun, as so much more land is upon this pole than the south, it will be in consequence more heated, as I have proved. And from that cause its repulsion must be so much the more considerable, accordingly it will be repelled further from the sun; and, in consequence of its repulsion, its motion will be accelerated; so *vice versa*.

Then, when the earth is more heated, it must act accordingly upon the moon, and repel it the more. And, therefore, it is worthy of remark, that the moon is at this time repelled so as to perform her circuit round the earth more expeditiously. So *vice versa*, when the earth is in its perihelion, the moon is likewise in her perihelion, the earth being less heated at this time, owing to its having a greater proportion of its waters opposed to it, viz. the waters of the south pole; therefore must in consequence repel the moon with less force.—But I will give you the phænomena, as allowed by philosophers, with my explanation of them.

B

Now,

Now, as the moon is a body whose distance from the earth is constantly changing, for she is always either drawing nearer or going further from us, let us investigate the phenomena, and see whether my system or Sir Isaac's will best account for them. —We will take *the irregularities* of the moon's motion, and that of her orbit, which are so considerable, from the CYCLOPÆDIA.*

“ *The irregularities of the moon's motion, and that of her orbit, are very considerable. For, 1. when the earth is in her aphelion, the moon is in her aphelion likewise; in which case she quickens her pace, and performs her circuit in a shorter time; on the contrary, when the earth is its perihelion, the moon is so too, and then she slackens her motion: and thus she revolves round the earth in a shorter space when the earth is in her aphelion than when in her perihelion; so that the periodical months are not all equal.*”

When the earth is in her aphelion, it is from the earth of the north pole being so much more considerably heated than the water of the south pole, there being a greater proportion of land upon the north than the south pole, earth being so much more susceptible of being heated than water, as the latter is an evaporable body, and flies off with the heat; consequently there is considerably more ice upon the south than the north pole: therefore, from being so much more heated, it will repel the

* I have taken the phenomena from the CYCLOPÆDIA, a book of reputation, and which is supposed not to be partial to any hypothesis.

sun the more; but, as it is so considerably the lighter body, it will be moved, and repelled further from the sun. Then, as the earth is more heated in its aphelion, it will in consequence repel the moon the more, forcing her to a greater distance from it; and also quickening her motion. So *vice versa* in her perihelion; as the repulsion is less, her motion will be slower, being more attracted, or drawn nearer to the earth.

“ 2. When the *moon* is in her syzygies, i. e. in the line that joins the centres of the earth and sun, which is either in her conjunction or opposition, she moves swifter, *ceteris paribus*, than when in the quadratures.”

Now this is clearly owing to repulsion; for in the conjunction the moon is immediately over the centre of that part of the earth which is heated; and in her opposition the centre of that part of the moon which is heated is directly opposed to the earth.

“ 3. According to the different distances of the *moon* from the syzygies, i. e. from opposition to conjunction, she changes her motion: in the first quarter, that is, from the conjunction to her first quadrature, she abates somewhat of her velocity; which in the second quarter she recovers; in the third quarter she again loses; and in the last she again recovers. This inequality was discovered by Tycho Brahe, who called it *the moon's variation*.”

In the conjunction, as the moon moves from the centre of the earth which is heated by the sun, she will be less exposed to its influence, and consequently move slower and slower, till she
 B 2 begins

begins to approach her opposition, being then what is called *the full moon*; that is, receiving the sun's heat upon all her surface which is immediately opposed to the earth; therefore her heated surface will accordingly repel; and as this repulsion takes place, her motion will be accelerated. The waters upon our earth will also be moved; and this accounts in the most unexceptionable manner for the tides, which are the highest at the full and change of the moon; that is, at her opposition and conjunction.

That the planetary motions are influenced by repulsion, is proved indisputably from the earth being repelled further from the sun at that period when it is the most heated with the sun's fire, as in our summer; the north pole having a greater proportion of earth than the south pole, and being further repelled from the sun at this period; whence it is that there are about eight days more in the summer half year, viz. from March to September, than in the winter, from September to March, from its performing a wider circuit in the heavens in our summer.

“ The full *moon* appears to the naked eye broader than a circular object subtending an equal angle seen by perfect vision. In a *moon* of three or four days old, the illuminated part appears too broad in proportion to the obscure part, and likewise seems to extend more outwards, or to have a greater diameter than the obscure part. Also, in an eclipse of the sun or *moon*, the bright part appears too broad in proportion to the dark part, and the eclipse appears less than it really is;” which is accounted for by the moon returning her fire after it has undergone its

its usual circulation in the satellite, which returning of the fire will produce that luminous appearance beyond the body of the moon.

I will not enter into the *minutiae* of Sir Isaac's doctrine of the sun's influencing these motions of the moon; for, from what I have already said, it must be unnecessary. I think my system must appear clear and obvious to every candid mind: but, if it wanted any aid, Mr. Herschell's paper, in the *Philosophical Transactions*, upon the satellites of the planet *Georgium Sidus*, would confirm it beyond all controversy. This accurate observer has discovered that two of its satellites have two most extraordinary singularities. Instead of moving from west to east, which all the heavenly bodies hitherto observed do, they actually move from east to west; and this retrograde motion of the satellites is not in the plane of the ecliptic in which the other heavenly bodies move, but perpendicular to it, moving round in the direction of the planet's poles instead of the equator.

To attempt to reason upon these phenomena, either by Sir Isaac's doctrine of the projectile force, or M. de la Place's most romantic idea of an imaginary atmosphere, would be absurd; therefore I will say nothing further, but see how far they corroborate my system, and if it can account for them. As I have, I hope, proved that the elementary motions are conducted by the two great principles of motion in the universe, viz. repulsion and gravitation, and that the principle of repulsion is from the particles of fire repelling each other, and the principle of gravitation from the particles of matter attracting each other; therefore, when the planets
move

move round the sun, or the satellites move round their planets, their motions will be from repulsion and gravitation. For perspicuity, we, for example, will take our earth and moon. Our earth has its moon moving round it from the principle of repulsion and gravitation, from the fire and matter that the earth possesses; but its fire is not equally distributed, for its equator possesses a great quantity, and its poles very little; therefore its repulsion and gravitation will not be equally distributed, but its equator will have a greater repulsion, and its poles a greater attraction, from the latter possessing matter and so little fire. Now, bodies moving in the plane of the earth's ecliptic will be under the influence of its fire, and be constantly and greatly repelled; that is, repulsion in that plane will predominate; but bodies moving in the plane of the earth's poles, as they possess so little of fire, or the repulsive principle, gravitation will in consequence predominate. Let us examine, when either of these powers predominates, what will be the motions of the planets. When one body is repelled from another, it will in consequence turn from it; and the more it is repelled, that is, the more repulsion predominates over gravitation, it will be repelled the more; that is, be forced to a greater distance from the body. This we have shewn to be strikingly the case when the greater body of the land is heated, as in our summer; the earth is consequently repelled a greater distance from the sun; and in our winter it is not so much repelled, when the sun is over the south pole, where there is proportionably a greater body of water, which carries off the sun's
fire

fire by evaporation, and makes the south pole be surrounded with so much more ice than the north pole.

Now let us consider what will be the motion of a body when it is attracted by another body, viz. a planet and its satellite. When attraction predominates, it will turn to the body which attracts it, being drawn towards it. This, as we have observed, cannot be done at the equator, as there repulsion predominates. But it may be done at the poles, as there they possess very little fire comparatively, and in consequence very little repulsion, and gravitation must predominate; which gravitation must have the effect of making the satellite turn to the planet, not from it. This is actually the case with two of the satellites of the *Georgium Sidus*; for, instead of moving in the same plane with the rest of the heavenly bodies, they move in a different one; and that, instead of moving from west to east, they move from east to west, turning to the planet, not from it; which is most indisputably by being principally under the gravitating, and not the repulsive principle. And another very singular circumstance attends these satellites—they disappear at a certain distance from the planet.—According to my system they possess less fire than the other planetary bodies, matter and gravitation being the predominating powers, and not fire and repulsion; in consequence, when they come near their illuminated planet, the *Georgium Sidus*, their weaker light will be overpowered.

I have not given all the *minutiae* of the variations of the motions of the moon; but, from the general principles

principles laid down, astronomers will be able to solve them. At some future period I may probably be more minute.

Now I think such a concatenation of strong facts is *almost* equal to mathematical demonstration, and must have due weight with the learned, enlightened, and candid world.†

Count Rumford produced a great quantity of heat from the attrition of iron bodies upon each other.—In my writings, particularly my Chemical Essays, I explain the whole process; shewing, beyond a doubt, that a calcination is produced. His process was not so well adapted to produce the calcination, as the machine was to tear off from one of the iron bodies large particles of iron, instead of rubbing it into an impalpable powder. But, if he will expose to great attrition a large proportion of mercury, with a small proportion of lead or tin in it, it will give out a great quantity of heat, and be perfectly calcined, though the air and all extraneous bodies are perfectly excluded.—*See my new Experiments, with my Observations upon them, now publishing by CADELL.*

† M. de la Place endeavours to shew that the acceleration of the moon's mean motion is the result of a gravitation decreasing in the precise duplicate ratio of the distance inversely. But how beautifully does my system account for it. As the surface of the earth or moon is heated, in the same ratio is the moon repelled from the earth, and in consequence its motion accelerated. Upon the common principle of mechanics, as it is pushed or repelled from the earth, its motion must be increased.

FINIS.

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EXPERIMENTS
SHEWING THAT
VOLATILE ALKALI FLUOR
IS THE
MOST EFFICACIOUS REMEDY

In the CURE of
ASPHYXIES;
(Or APPARENT DEATH by Drowning, &c.)
WITH
REMARKS

UPON THE
Advantageous EFFECTS produced by it in the
BITE of the VIPER, CANINE MADNESS,
BURNS, APOPLEXY, &c.

Translated from the French of M. SAGE,
By THOMAS BRAND,
MEMBER of the CORPORATION of SURGEONS, LONDON.

Contraria contrariis curantur.

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